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EXPERIENCE OF SANITARY-VIROLOGICAL SEWAGE TESTS

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(Opyt sanitarno-virusologicheskogo issledovaniya stochnykh vod)

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EXPERIENCE OF SANITARY-VIROLOGICAL SEWAGE TESTS

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Enteroviruses are widely distributed among humans and with the excreta of patients and virus carriers enter sewage, which is the main source of contamination of environmental objects with virus microflora. From the incidence of enteroviruses in sewage their circulation among the population can be evaluated; therefore, regular sanitary-virological sewage control is of great epidemiological importance. In sewage tests, viruses are concentrated on gauze pads according to the method described by Moore with subsequent treatment by the Riordan method, using ether (V. A. Kazantseva; G. A. Bagdasar'yan). We must say that treatment of sewage by the Riordan method is quite time consuming, especially for laboratories with a small staff. Besides the generally accepted method of treating sewage with ether, many researchers (K. Yu. Atabekov; M. P. Chumako, G. A. Bagdasar'yan, and others) use antibiotics; however, the literature lacks data on comparative evaluation of these methods. We made a study of the distribution of enteroviruses in sewage, using both methods of sample treatment.

Sanitary-virological sewage tests were made in 1968-1970. Sewage samples were taken by the gauze pad method in sewer traps of medical institutions and in purification facilities of Orel. Material squeezed from the pads was centrifuged at 3500 rpm for 15-20 minutes. After two centrifugings, superprecipitated liquid was divided into 2 parts: one part of the sample was treated with antibiotics according to the fecal treatment method (3000-4000 units of penicillin and 2000-3000 units of streptomycin per 1 ml centrifugate), the second was treated with ether according to the generally-accepted method. Treated samples of sewage were tested in two tissue cultures [Ner-2 and human embryo fibroblasts (HEF)]. The isolated cytopathogenic agents were identified by hemagglutination reaction with human erythrocytes, delay of hemagglutination reaction and neutralization reaction with serotypes to viruses of poliomyelitis, ECHO 1-29, Coxsackie A — 9, Coxsackie B 1-6 and adenoviruses. In the Ner-2 culture, from 141 sewage samples, 68 strains of enteroviruses were isolated; of these, 40 (28.3%) strains were from samples treated with antibiotics and 28 (19.9%) strains were from samples treated with ether.

In the human embryo fibroblast culture, 110 strains of viruses were isolated from 172 samples; of these, 72 (41.2%) strains were from samples treated with antibiotics and 38 (22.1%) strains were from samples treated with ether.

Thus, in treating samples with ether, the isolation of viruses in these two tissue cultures was 8.4-19.8% lower than that from samples treated with

antibiotics. Evidently, the partial loss of viruses in treatment with ether could occur either because of the multiplicity of manipulations or as the result of the adsorption of viruses in the fatty fraction of sewage, which is extracted under the effect of ether.

These data show that treatment of samples with antibiotics ensures sufficiently reliable purification from microorganisms and the isolation of enteroviruses in the Ner-2 and HEF cultures is slightly increased. The method of treating sewage with antibiotics is less time consuming and more available for small laboratories, especially in cases of mass studies.

The significant distribution of enteroviruses in sewage has been established. In individual months their isolation reached 80-100%. During the last three years ECHO viruses types 6 and 7 have been isolated continuously; in individual cases type 19 viruses and polioviruses were isolated. In 1969 the isolation of ECHO viruses types 6 and 7 decreased, but that of types 19 and 12 increased sharply; types 13 and 29 were found in individual cases, type 11 remained at the level of the previous year, Coxsackie B virus types 1 and 5 appeared. In 1970 ECHO viruses types 6 and 7 ceased to be isolated either from sewage or from patient excreta, the isolation of types 19 and 12 viruses was sharply reduced but that of Coxsackie B viruses types 1, 3 and 5 continued to increase.

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